

# CĂTĂLINA CANGEA

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## PERSONAL PROFILE

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Third-year PhD student at the University of Cambridge, focused on learning multimodal and graph-structured representations of the world. Born on May 17, 1994 in Ploiești, România.

## EDUCATION

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### Department of Computer Science, University of Cambridge, UK

PhD in Machine Learning (October 2017–present)

MPhil in Advanced Computer Science (October 2016–July 2017)

*Distinction (81%)*

BA in Computer Science (October 2013–June 2016)

*First Class (75%) - 3rd year*

### Colegiul Național "I.L.Caragiale", Ploiești, România

Computer Science & Mathematics (September 2009–May 2013)

*Valedictorian (grade 10/10)*

## SELECTED RESEARCH PUBLICATIONS

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### Graph Density-Aware Losses for Novel Compositions in Scene Graph Generation (third)

Novel density-normalized edge losses and weighted metrics for scene graph generation in few/zero-shot settings, at no extra computational cost. Results on Visual Genome and GQA. Under review.

### Deep Graph Mapper: Seeing Graphs through the Neural Lens (joint first)

A fusion between Mapper (a Topological Data Analysis method) and graph neural networks that produces highly informative graph visualisations and a powerful pooling layer. Under review.

### VideoNavQA: Bridging the Gap between Visual and Embodied Question Answering

Novel task that studies QA performance in EQA-like settings with nearly-ideal navigation paths. Generalised VQA models for temporal reasoning. Published at *BMVC 2019* and *ViGIL NeurIPS* spotlight.

### Spatio-Temporal Deep Graph Infomax (third)

Unsupervised node representation learning using mutual information maximisation. Improves predictive performance of spatio-temporal auto-regressive models. Presented at the *ICLR 2019 RLGM Workshop*.

### Towards Sparse Hierarchical Graph Classifiers (joint first)

CNN-like architecture with sparse pooling for graph-structured data. Matched SOTA on benchmarks, memory reduced from  $O(V^2)$  to  $O(V + E)$ . Presented at the *NeurIPS 2018 R2L Workshop*.

### XFlow: Cross-modal Deep Neural Networks for Audiovisual Classification

Multimodal architectures with cross-modal dataflow. SOTA on benchmarks. Published in *IEEE TNNLS*. Presented at the *ARM Research Summit 2017* and *CMCML Workshop, ICDL-EPIROB 2017*.

## PROFESSIONAL EXPERIENCE

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### Research Scientist Intern—DeepMind

July 2020–October 2020

Working with Piotr Mirowski and Raia Hadsell.

**Consultant—Relation Therapeutics** June 2020–present  
 Developing (graph-)ML solutions to aid in drug development and repurposing efforts.

**AI Resident—X, the moonshot factory** May 2019–August 2019  
 Worked on an early-stage project, using and adapting recent ML techniques to a real-world problem.

**Research Intern—Mila** July 2018–September 2018  
 Collaboration with Aaron Courville on a visual reasoning project which resulted in a novel benchmark and alternative perspective on EQA-style tasks, published at BMVC and spotlight talk at ViGIL NeurIPS.

**Software Engineer Intern—Facebook London** June 2016–September 2016  
 Worked on the LogDevice team, making client operations on a distributed RocksDB data store more efficient and flexible, while leading to fewer system failures.

**Software Engineer Intern—Facebook New York** July 2015–September 2015  
 Worked on iOS Product Infrastructure to reduce the time taken by the Facebook iOS app to load content close to the screen current view. Improved the infrastructure and network request prioritisation system.

**STEP Intern—Google Zürich** June 2014–September 2014  
 Added processing progress for video uploads on YouTube. Developed a JavaScript client implementation that requests processing information from the server and thumbnail rendering of processing videos.

## PROFESSIONAL SKILLS

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<b>Programming Languages</b>	Python, C, C++, Standard ML, Java, C#, Objective-C, JavaScript
<b>Machine Learning APIs</b>	PyTorch, TensorFlow, Graph Nets, Sonnet, Keras, CUDA

## TEACHING / SUPERVISING

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**Lectures:** *Graph Generation Methods - R250 Advanced Topics in ML and NLP (Master's course)* (2020)

**Master's projects:** *"Representation Learning for Spatio-Temporal Graphs"* (2018–2019), *"Dynamic Temporal Analysis for Graph Structured Data"* (2018–2019)

**Undergraduate projects:** *"Deep Learning for Music Recommendation"* (2017–2018), *"The PlayStation Reinforcement Learning Environment"* (2018–2019), *"Benchmarking Graph Neural Networks using Wikipedia"*, *"Multimodal Relational Reasoning for Visual Question Answering"* (2019–2020)

**Undergraduate courses:** Artificial Intelligence, Databases, Discrete Maths, Foundations of Computer Science, Logic and Proof, Machine Learning and Real-World Data

## EXTRACURRICULAR ACTIVITIES

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<b>Chair/Deputy chair</b> , women@CL, University of Cambridge	October 2018–July 2020
<b>Machine Learning Teaching Fellow</b> , Cambridge Spark	May 2018–present

## LANGUAGES

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English (fluent), French (beginner), Romanian (native)

## INTERESTS

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**Music** Guitar and vocals in a rock band—we play in colleges, pubs and at Cambridge May Balls

**Rowing** King's Women's First Boat (Jan 2018–present), Darwin/King's Second Boat (Jan–Dec 2017)